AFTA-WFIRST Coronagraph Technology (ACT) Development

Completed Technology Project (2013 - 2017)

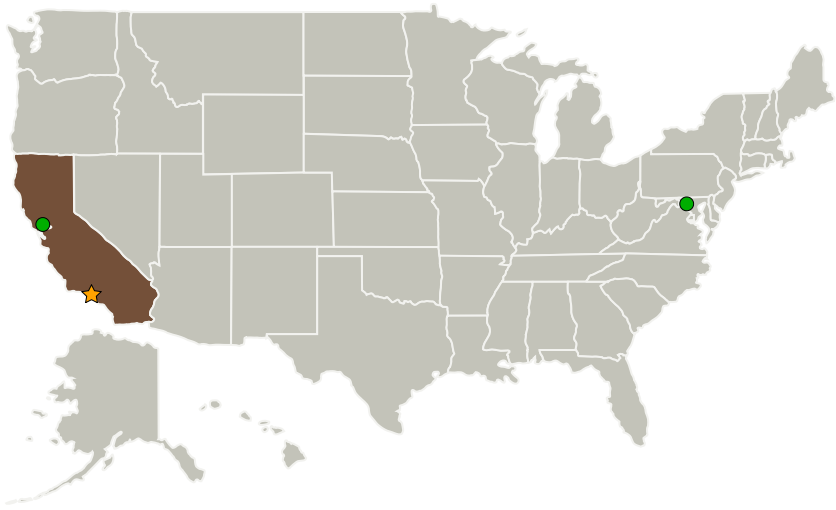
Project Introduction

Direct imaging of exoplanets allows their spectral characterization, revealing their atmospheric composition and, potentially, signs of life

Anticipated Benefits

NASA funded: WFIRST/AFTA mission study Any future astrophysics mission with scope that includes direct imaging of exoplanets, such as ATLAST/UVOIR studies

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
●Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
California Institute of Technology(CalTech)	Supporting Organization	Academia	Pasadena, California
●Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland
Northrop Grumman Systems Corporation	Supporting Organization	Industry	Falls Church, Virginia
Princeton University	Supporting Organization	Academia	Princeton, New Jersey
Space Telescope Science Institute(STScI)	Supporting Organization	Academia	Baltimore, Maryland
University of Arizona	Supporting Organization	Academia Alaska Native and Native Hawaiian Serving Institutions (ANNH)	Tucson, Arizona
Xinetics, Inc.	Supporting Organization	Industry	Devens, Massachusetts

Co-Funding Partners	Type	Location
Science Mission Directorate(SMD)	NASA Mission Directorate	

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Game Changing Development

Project Management

Program Director:

Mary J Werkheiser

Program Manager:

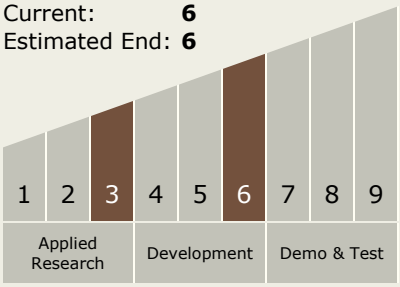
Gary F Meyering

Principal Investigator:

Feng Zhao

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



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Primary U.S. Work Locations

California

Project Transitions

October 2013: Project Start

April 2017: Closed out

Closeout Summary: STMD/GCD investment over the past 4 years has brought coronagraph technology to TRL-5 with demonstrated system performance. The Coronagraph project has demonstrated a raw contrast ~10-8 which is 100x bett er than SOA (HST, JWST). Due to the successes of the Coronagraph technology development effort, the Science Mission Directorate has baselined the Coronagr aph instrument on the WFIRST mission. It is expected that a coronagraph instru ment will directly image many extrasolar planets to greatly improve our underst anding of the universe. The Coronagraph Project developed key technologies ne eded for directly imaging planets around other stars. Coronagraph was base-line d as part of Wide-Field Infrared Survey Telescope. The Coronagraph technology investment advanced the sensors, optics, filtering, and algorithms to TRL 5 with a demonstrated system performance. A final integrated test pf the occulting ma sk with high contrast imaging filtering demonstrated an object contrast sensitivit y of 1 part in 100 million with light filtering centered at 550 nm in a simulated d ynamic environment which was a 100 times improvement in State of the Art cap abilities for planetary science missions.

Stories

Deformable Mirror Infusion
(https://techport.nasa.gov/file/164918)

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Target Destination

Outside the Solar System